



## **FIRE RISK MANAGEMENT, INC**

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# **Memo Report**

**From:** W. Mark Cummings, P.E.

**To:** Mr. Gil Helmick

**Subject: Fire Safety Evaluation of Residential Property Located at 39 Cumberland Ave.,  
Portland, ME**

As requested, Fire Risk Management, Inc. (FRM) has reviewed several fire safety aspects associated with prior renovation activities within the building located at 39 Cumberland Avenue in Portland, ME. Specifically, this review is in response to questions that have been raised by City officials regarding the egress and fire separation issues associated with the basement area of the building, along with a number of other fire separation and life safety issues throughout the building.

### Background

The building being reviewed has been recently renovated and updated to improve the overall condition of the building, along with a number of modifications to the interior of the 2<sup>nd</sup> and 3<sup>rd</sup> levels to accommodate the desire by the owner to occupy space on both these levels; combining them into a single dwelling unit. However, a portion of the 2<sup>nd</sup> level that was initially designed to act as an "in-law" apartment is currently being used as a rental unit. As such, this building is considered as including three (3) separate dwelling units, along with having a common basement area that is accessible to all occupants (tenants).

The building construction would be classified as a Type VB, per the International Building Code (IBC) or a Type V (000) as defined by the National Fire Protection Association (NFPA). Based on the portions of the floor/ceiling assemblies that were visible, the building appears to consist mostly of heavy timber construction. In its current configuration, the building would be classified as a Residential (R-2) occupancy, as defined by the IBC.

The building is provided with two (2) separate stairways that are located at the southeast (front) and northwest (rear) ends of the building. Subsequent to the renovations, the front stairway now serves only a single dwelling unit; that which is occupied by the building owner and consists of approximately half of the 2<sup>nd</sup> floor and the entire 3<sup>rd</sup> floor. This stair is fully contained within a single dwelling unit and is enclosed only at the main (1<sup>st</sup>) floor; opening into the building's entry vestibule. The rear stairway serves all three (3) floors above grade and has been updated to provide a 1-hour fire separation from the remainder of the building. The stairway leading up from the basement opens into the rear stairway at the main floor level and has been designed to maintain a 1-hour fire separation between the basement and the rest of the building, including the rear stairway.

The primary means of egress from the 2<sup>nd</sup> floor "in-law" apartment is the rear stairway, but this apartment is also connected to the 2<sup>nd</sup> floor of the owner's apartment via an existing door; which has also been designed to provide a 1-hour fire separation between these two apartments. It is reported that this doorway cannot be locked and would be available as a secondary means of egress by either the owner or the tenant.

Discussion

There are a number of unique aspects associated with this building such that it does not readily "fit" into the existing (standard) code requirements. This is due both to its size (only three apartments) and configuration. Although this building would be classified as an "apartment building" per NFPA definitions, many of the fire separation and egress requirements within the Life Safety Code® (NFPA 101) are intended to apply to much larger buildings. Since this building is "existing," the primary codes that would typically be used as reference for this review and evaluation are the Life Safety Code®, NFPA 101, and the International Existing Building Code (IEBC); albeit the extent of the renovations for this project are such that the IEBC would typically require that much of the IBC would still be applicable. NFPA 101 is being used as the principle reference for evaluating the life safety components of this building. Specifically, those requirements outlined in Chapter 31, *Existing Apartment Buildings*, were used in supporting this evaluation; albeit due to its size and configuration, the requirements in Chapter 21, *One and Two Family Dwellings*, may likely be more applicable and still provide sufficient life safety for all occupants. Since the City's regulations would consider the extent of this renovation to exceed 50% of the building, the requirements for *New Apartment Buildings*, Chapter 30 of NFPA 101, were also reviewed for applicability.

Code is for apartments

disagree, if so it would be written that way

Although all dwelling units will have access to two separate means of egress, due to the height (3-story) and configuration of this building, the Life Safety Code® would allow that only one means of egress be provided, per Section 31.2.4.4; provided that the stair is enclosed with 1-hour fire barriers, each apartment is separated from the others by barriers having at least a ½-hour fire resistance rating, and the maximum travel distance from the apartment entrance doors to the exit is no more than 35 feet. This building will generally meet all of those requirements. Section 1021 of the IBC would also allow a R-2 occupancy of this size and configuration to have a single exit from each unit/story. The only area in question would be the lack of a fire rating on the doors that provide access to the stairway from the apartments. These doors do consist of solid wood cores that would otherwise be acceptable if the building was provided with either a sprinkler system or a building wide fire alarm system. However, given the very short travel distances from each dwelling unit, coupled with the fact that each unit does have access to a secondary means of egress, it is considered that the existing doors do provide more than sufficient fire separation for the stairway in this building to provide an adequate level of life safety. However, automatic door closing devices should be added to all doors that open to the common stairway. This could be accomplished using a standard door-closing device or spring-loaded hinges.

"generally" meeting code is not acceptable

if fire door are required then they need to be in place

Questions have been raised regarding both the fire separation and egress requirements for the basement area of the building. It was stated that the City officials indicated that a 2-hour fire separation should be provided between the basement and the rest of the building. Based on the code requirements that we believe to be applicable, only a 1-hour fire separation would be necessary for the floor/ceiling assembly that separates the basement and 1<sup>st</sup> floor. Given the fact that the existing assembly consists of heavy timber construction, the 1-hour requirement would have been met by the inherent construction of the building; albeit any penetrations through this assembly would still need to be properly sealed. We see no justification for the addition of a fire-rated drywall ceiling. The codes do require that the "furnace room" be separated from the rest of the building with 1-hour fire-rated barriers. In this instance, this would require that the portion of the basement that is to be designated as the furnace room be provided with rated walls and doorway to separate this room from the rest of the building. Depending on the desires of the owner, this could be accomplished by simply adding a new doorway, or wall and doorway, at one of the existing locations where it is possible to make use of the basements existing configuration to minimize the need for additional construction.

The basement area is only accessible to the tenants of this building. As such, it is considered to be part of the "R-2" building occupancy. This building would not be classified as being a "mixed use" occupancy and therefore has no additional fire separation requirements beyond that for the residential occupancy. Regardless, as is outlined in Table 1021.2 of the IBC, even if areas of the basement are to be classified separately, it would still only require a single means of egress. Based on the basement configuration, the

occupant loading in this area would be well below the allowable limits for the applicable occupancies and the travel distance to the exit will be within the 75-foot distance that is allowed. It is also understood that concern was raised by the City regarding the fact that the door leading from the basement to the main floor is hinged on the side that inhibits ease of travel to the exterior without having to first close the door to continue. Given the very limited number of occupants that will be within the basement at any point in time, any delay in egress due to this door configuration would be almost negligible. No matter which side this door is hinged in the frame, it will impede progress within the stairway at this point, whether coming from the basement, or from the 2<sup>nd</sup> floor above. This building was reported as being constructed in the late nineteenth century; when narrow stairways and corridors were common. It was not discussed whether or not this building is listed by any of the local or National Historic Registries, but the only means to rectify the narrow nature of the existing configuration would entail a significant alteration of the building's structure or the addition of an exterior stairway; neither of which would have a significant impact on improving this building's life safety.

Concern was also raised regarding the need for carbon monoxide (CO) and smoke detection throughout the building. The codes do require that the dwelling units be provided with both CO and smoke detection. As a result of the renovation activities, it is likely that these devices will need to be provided with a permanent electrical connection, along with having battery back-up power available as well. During the site review, it appeared that the dwelling units were provided with smoke detection as required by codes; this includes having a smoke detector on every level, along with having one within each bedroom and one that is located outside each bedroom. Often, this requirement for having a detector outside each bedroom is coupled with the requirement for having one on each level by installing a smoke detector in a common hallway or area that is adjacent to all bedrooms. Based on the building's layout, the central hallway on each floor is a good location to accomplish this objective. The exception to this will be the 2<sup>nd</sup> floor, whereby an additional detector is needed on the "in-law" apartment side of the doorway that isolates this area from the central hallway. Given that the dining area on the 3<sup>rd</sup> floor is open to the central hallway, this area can be considered an extension of that "common" area and would still accommodate the location of the guest bedroom that is adjacent to the dining area. Currently no CO detectors are provided within the building. To meet code requirements, a CO detector should be installed on each level, outside sleeping areas. Depending on compatibility, it may be possible to simply replace the existing smoke detectors installed in the common areas (hallways) with a combination CO/Smoke detection device. It will also be necessary to add a CO detector in the furnace room.

#### Summary and Recommendations

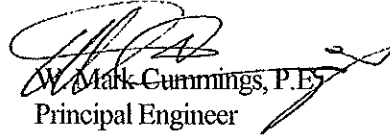
Based on the site survey of the building at 39 Cumberland Avenue in Portland, ME, it is believed that this building is mostly compliant with applicable code requirements. With the exception of the recommendations provided below, it is believed that this building does provide all tenants with a sufficient level of fire and life safety. The following recommendations are provided to address those issues where additional measures are needed to better meet code requirements, along with providing some additional life safety in specific areas.

1. The furnace room in the basement will need to be isolated from the rest of the building. As discussed during the site survey, there are a number of options available to accomplish this. Once this area is isolated, it will also be necessary to install a CO detector within this room. No other modifications to the basement area are necessary to meet code requirements.
2. Automatic closing devices should be provided on all doors that open to the rear stairway.
3. As a result of the sound-proofing that is associated with the room in the basement that is used for practicing musical instruments, it is recommended that a smoke detector, or other notification device, be installed within this room that is also connected to the smoke detector(s) in the other

area(s) of the basement, such that should they actuate, anyone within this room would have a better likelihood of hearing the alarm.

4. As outlined above, it will be necessary to add CO detectors in the common areas on each floor of each dwelling unit.

If you have any questions regarding what has been outlined above, please don't hesitate to contact me.

  
W. Mark Cummings, P.E.  
Principal Engineer

- ① ~~No~~ No second means of ~~escape~~ escape from basement.
- ② This is by definition a "living area"